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PRELIMINARY NOTES ON SPHAGNUM SECT. SUBSECUNDA IN SOUTH AMERICA

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The species of *Sphagnum* sect. *Subsecunda* have a reputation, probably undeserved, of unlimited variability, and the tendency has been to sweep the species under the rug, to refer them all to *S. subsecundum* Nees, in the broadest possible sense. It is true that the species are, in many cases, no more than varying combinations of some few characters, difficult to fix in mind, and no doubt many of the so-called species are poorly founded, mere products of a degree of variability within a species. Such species are especially difficult to evaluate when few collections are available for study, and that is generally true of the South American representatives of the section.

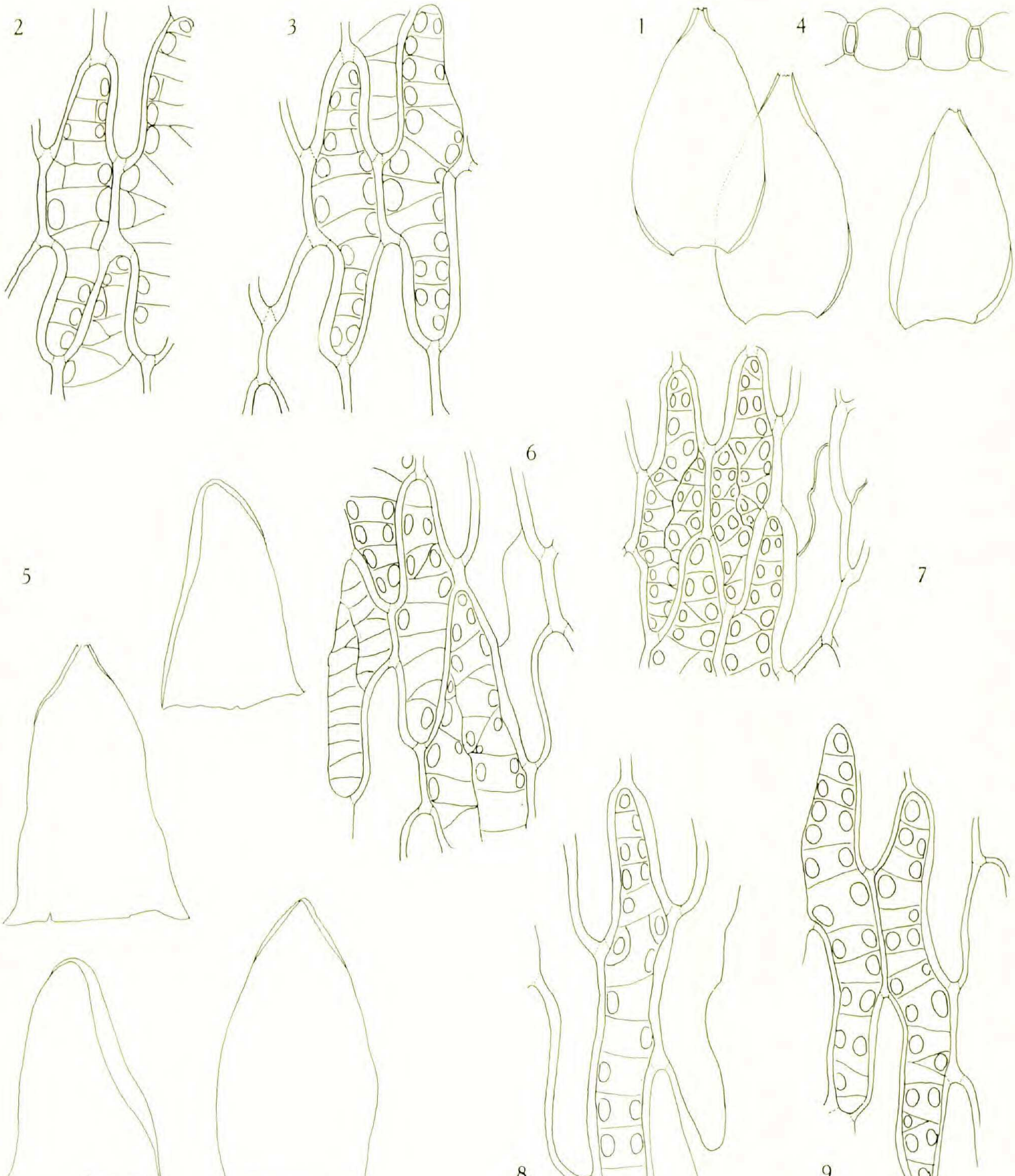
Warnstorf (1911) recognized 29 South American species of *Subsecunda;* most of them he described from southern Brazil. Andrews (1959) said of the 114 species that Warnstorf recognized worldwide: "Of these our *S. pylaesii* Brid. is, of course, distinct; so are obviously *S. Novo-caledoniae* Par. & Warnst., *S. gracilescens* Hampe, and probably a few others. The rest belong in the mass of variable *S. subsecundum* Nees." He had earlier (1913) allowed a single species, *S. subsecundum,* in the flora of North America and gave it a long list of synonyms, some of which are currently and, I think, justifiably recognized as good species or varieties. In my revision of the North American species of *Sphagnum* (1984), I recognized a few of these at a varietal level, not because I thought of them as especially close to *S. subsecundum,* but because the whole complex needs to be revised and regularized on a world basis before species can be meaningfully segregated.

I have been greatly influenced by Andrews' cautious attitudes concerning species limits, as indeed all sphagnologists of the past half century have been. It is understandable that Yano et al. (1985) followed Andrews' lead and recognized *S. subsecundum* in a broad sense from many localities in southern and southeastern Brazil. I have not yet been able to study in detail the *Subsecunda* of Brazil, but I can say that I have never seen a South American *Sphagnum* that I could comfortably refer to *S. subsecundum.* I have referred the odd collection to *S. subsecundum* var. *rufescens* (Nees et al.) Hüb., often known as *S. lescurii* Sull. (from Brazil, Venezuela, Colombia, Ecuador, and several parts of Central America). But that variety or species, as you will, lacks definition. It is highly variable, and the name is little more than a temporary convenience, in South America as in other parts of a broad range. Using the name is another way of avoiding a decision.

Sphagnum boliviae Warnst. has the leaf section of a typical member of the *Subsecunda,* but it is certainly not what I would refer to *S. subsecundum,* however variable that species may be. It has stem and branch leaves essentially alike in structure and not too different in size and shape. The stem leaves are fibrillose to the base and have commissural rows of pores on both surfaces nearly to the base. In

both stem and branch leaves the rows can be continuous or more or less interrupted. Some to many hyaline cells of stem leaves are once-divided.

I have examined three Bolivian specimens collected by R. S. Williams at altitudes of about 1600 meters. These specimens, at the New York Botanical Garden, are the types of *S. boliviae* Warnst., var. *virescens* Warnst., and f. *brachy-anocladum* Warnst. They show some few, trivial differences, and I see no reason to parcel them out under three names. I have seen another Bolivian specimen, from 3000 meters altitude, collected by Marko Lewis (near Corani, depto. Cochabamba, no. *79-2178*,

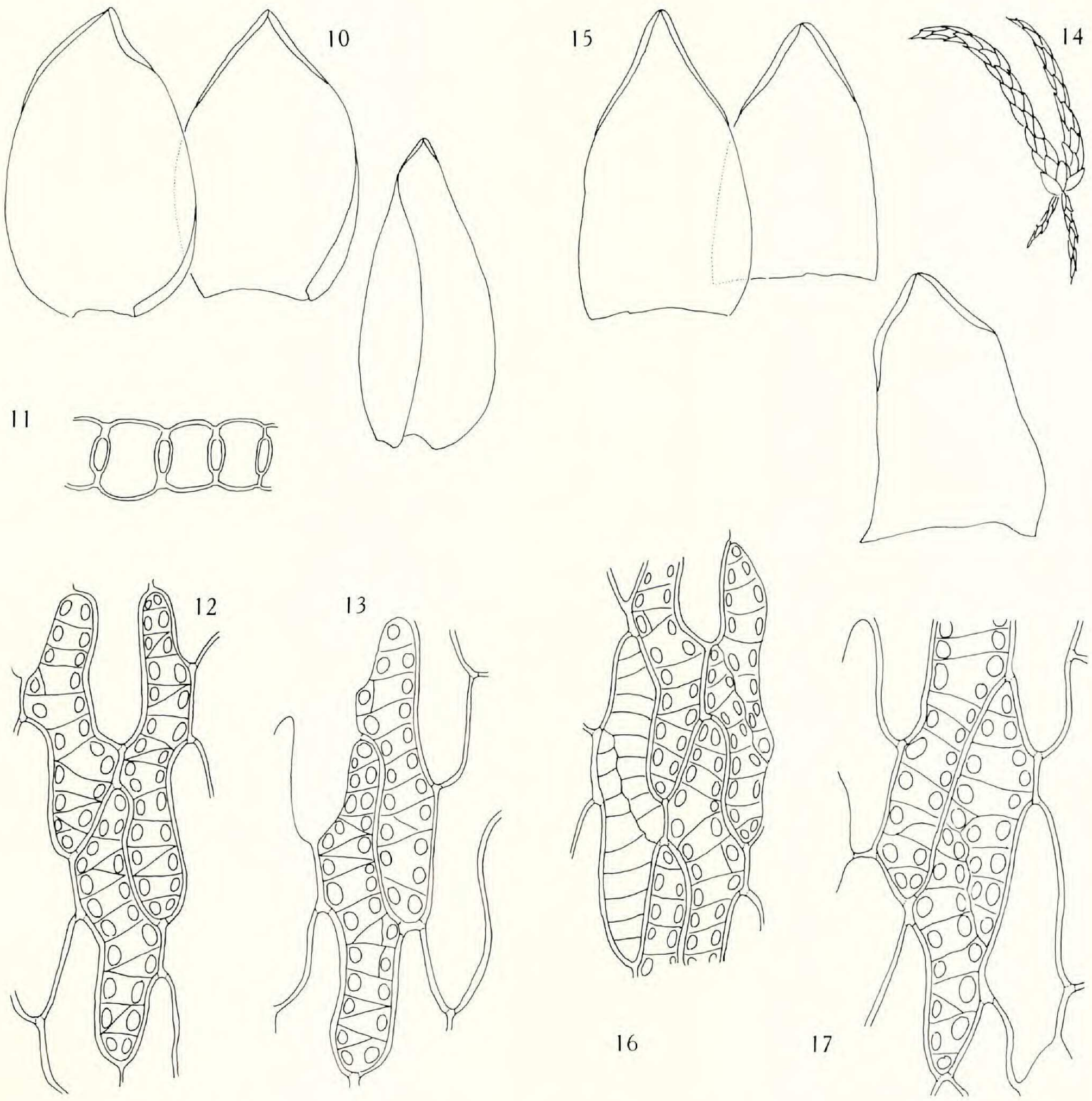


FIGS. 1–9. *Sphagnum boliviae,* drawn from the type. 1. Branch leaves, ×23. 2. Upper cells of branch leaf, outer surface, ×358. 3. Upper cells of branch leaf, inner surface, ×358. 4. Portion of branch leaf in section, ×358. 5. Stem leaves, ×23. 6. Upper cells of stem leaves, with some hyaline cells 1-divided, outer surface, ×358. 7. Upper cells of stem leaves, with some hyaline cells 1-divided, inner surface, ×358. 8. Upper cells of stem leaf, with cells undivided, outer surface, ×358. 9. Upper cells of stem leaf, with cells undivided, inner surface, ×358.

MICH, F). It is interesting because of the dark red color of the upper parts of the plants and a pale red wood cylinder in the stems. The altitudinal difference, as well as the absence of the orange-brown or yellowish tinges expected in the *Subsecunda,* made me try to justify describing a new species, but the structural characteristics vary only slightly from those of the other known collections of *S. boliviae.*

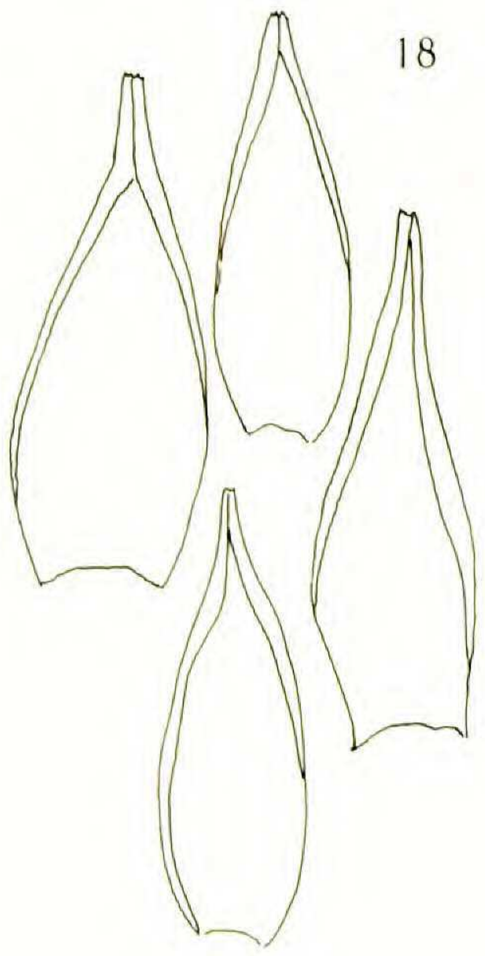
Warnstorf cited Williams' no. *1689* as *S. boliviae, 1690* as var. *virescens,* and *1692* as f. *brachy-anocladum.* He indicated that the var. *virescens* differs in having hyaline cells of stem leaves divided. Actually no. *1689,* the type of var. *boliviae,* has most cells divided, and the other two specimens have only a few or none divided. They are also commonly divided in Lewis' collection. I do not find the character constant enough from leaf to leaf or plant to plant to give it any taxonomic weight.

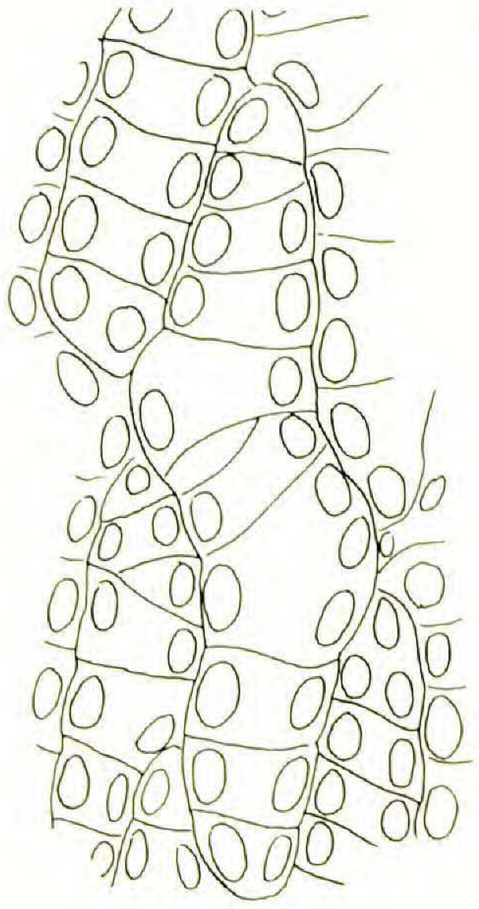
The accompanying illustrations of the type collection of *S. boliviae* (*Williams 1689*) and the Lewis collection document the subtle differences in structure that I have been able to detect (Figs. 1–17).

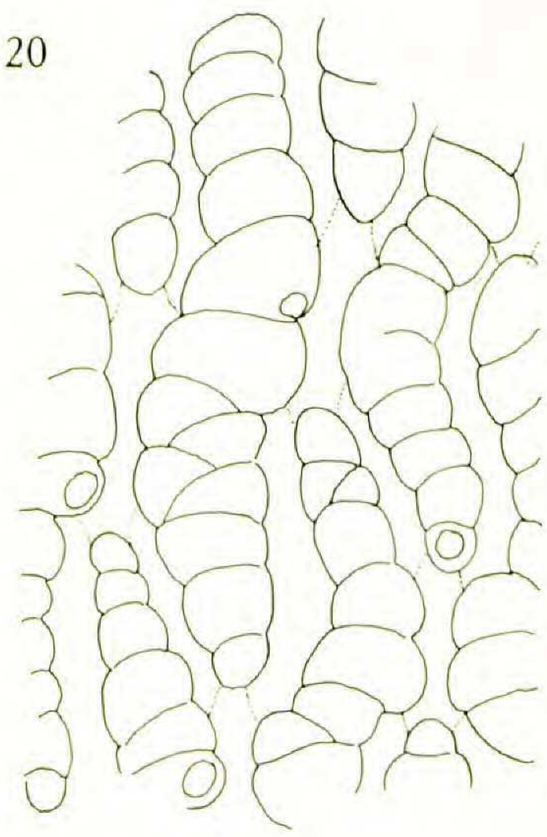


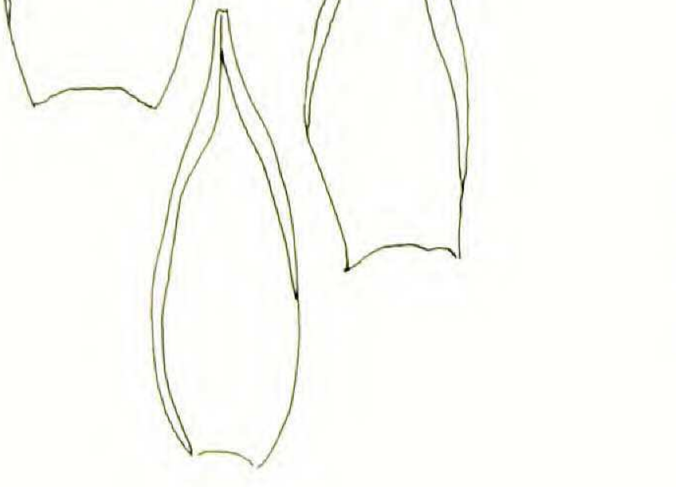
FIGS. 10–17. *Sphagnum boliviae,* drawn from *Lewis 79-2178.* 10. Branch leaves, ×23. 11. Portion of branch leaf in section, ×358. 12. Upper cells of branch leaf, outer surface, ×358. 13. Upper cells of branch leaf, inner surface, ×358. 14. Fascicle of branches, ×2.5. 15. Stem leaves, ×23. 16. Upper cells of stem leaf, outer surface, ×358. 17. Upper cells of stem leaf, inner surface, ×358.

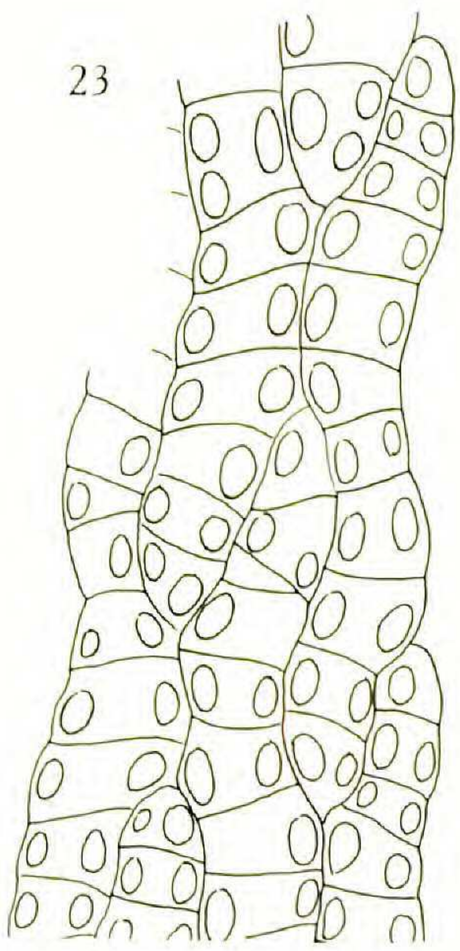
Because Andrews considered *S. gracilescens* Hampe ex C. M. a "clearly marked species," I was interested to see for myself. In the herbarium of the University of Michigan is a single Brazilian specimen that was determined by Müller (Rio de Janeiro, an Felswänden der Tijuca, *Ule 1932*). The specimen was cited by Warnstorf (1911) as *S. gracilescens* var. *laxifolium* (Warnst.) Warnst. (It is not the type, but it conforms to the original description.) As Andrews pointed out, *S. gracilescens* is indeed remarkable for branch leaf sections like those to be expected in the section *Acutifolia*. The green cells in section are broadly triangular or somewhat trapezoidal, with a broad exposure on the inner surface and none or very little on the outer. The stem leaves are fibrillose in the upper half. They have pores very few or none on the inner surface, but on the outer surface, toward the leaf apex, they are crowded in commissural rows, and in the lower half of the leaf are single pores at the upper ends of cells. The branch leaves have numerous commissural pores on the outer surface, in beadlike rows and only a few end or corner pores on the inner surface, or none at all. The stems have a single layer of hyaline cells

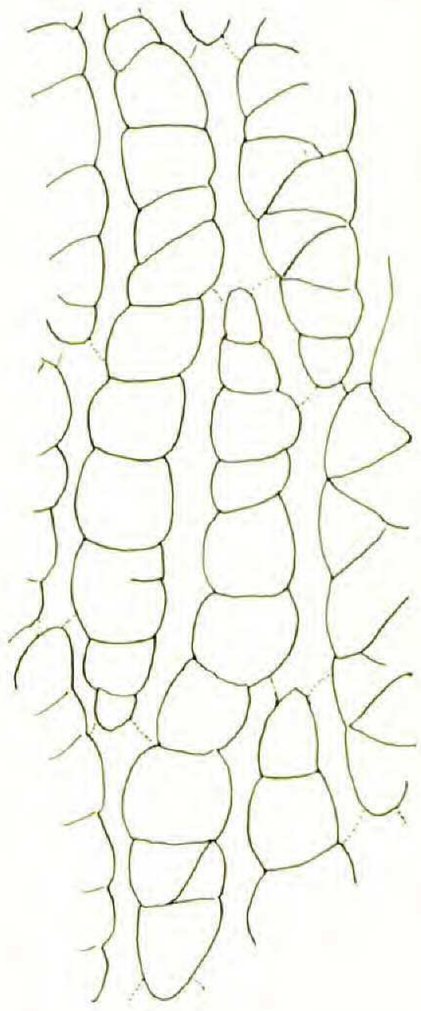












FIGS. 18–24. *Sphagnum gracilescens*, drawn from *Ule 1932*. 18. Branch leaves, ×23. 19. Upper cells of branch leaf, outer surface, ×358. 20. Upper cells of branch leaf, inner surface, ×358. 21. Portion of branch leaf in section, ×358. 22. Stem leaves, ×23. 23. Upper cells of stem leaf, outer surface, ×358. 24. Upper cells of stem leaf, inner surface, ×358.

lacking in pores, and the wood cylinder is yellowish. In spite of some resemblances to the *Acutifolia* and to such a species as *S. limbatum* Mitt., there is no hint of red in the plants (which are brownish tinged as usual in the *Subsecunda*), and the pores on the dorsal surface of stem and branch leaves, particularly near the leaf tips, are unquestionably those of the *Subsecunda*. The plants appear to be quite variable, judging from Warnstorf's description of several varieties, and the accompanying illustrations accordingly document only one expression of the species (Figs. 18–24).

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